Rinderpest
Cattle Plague

Importance
Rinderpest is an acute, contagious disease of cattle, domestic buffalo, and some species of wildlife. It is characterized by fever, oral erosions, diarrhea, lymphoid necrosis, and high mortality.

Etiology
Rinderpest virus (RPV) is a single-stranded RNA virus in the family Paramyxoviridae, genus Morbillivirus. Although there is just one serotype of RPV, individual strains vary in their virulence.

Species affected
Most cloven-hooved animals are susceptible to rinderpest virus to varying degrees. Domestic cattle, buffalo, and yaks are particularly susceptible. Sheep, goats, pigs, and wild ungulates can also be affected.

Geographic distribution
In the past, rinderpest was found throughout Europe, Africa, Asia, and West Asia. It is still found in a few areas of Africa, and perhaps central Asia, its original ancestral home. A Global Rinderpest Eradication Programme (GREP) has been managed by the Food and Agriculture Organization of the United Nations (FAO) with the goal of completing the global eradication of rinderpest by 2010.

Transmission
Transmission of the rinderpest virus occurs through direct or close indirect contact with infected animals. The virus is shed in nasal and ocular secretions and feces. The most infectious period is from 1-2 days prior to the onset of clinical signs, to 8-9 days after the clinical signs are apparent.

Incubation period
The incubation period for rinderpest ranges from 3 to 15 days; usually 4 to 5 days is typical. Virulence, dosage, and route of exposure all affect the incubation period.

Clinical signs
Rinderpest infections can be peracute, acute, or subacute depending on the virulence of the strain and resistance of the infected animal. In the peracute form, seen in highly susceptible and young animals, the typically signs are an acute high fever, congested mucous membranes, and death within 2 to 3 days. Animals with the acute or classic form begin with signs of fever, depression, anorexia, and increased respiration and heart rate, which then progress to include mucous membrane congestion, serous to mucopurulent ocular and nasal discharge, and oral erosions with salivation. After 2-3 days, the fever subsides and gastrointestinal signs appear. Animals may have profuse watery or hemorrhagic diarrhea containing mucus and necrotic debris, severe tenesmus,

dehydration, abdominal pain, abdominal respiration, weakness, and recumbency. Death may occur within 8 to 12 days. Occasionally, in the acute form, the clinical signs will regress by the tenth day and animals may recover within another 10 to 15 days. The subacute or mild form has a low mortality rate and only a few of the classic signs are present.

In sheep, goats and pigs, signs may include fever, anorexia, and sometimes diarrhea. Pigs may also show signs of conjunctivitis, oral erosions, and death.

Post mortem lesions

Depending on the strain of virus, rinderpest will sometimes cause oral lesions that initially appear as small necrotic foci, which then slough leaving red erosions. These lesions may be present on the gums, lips, hard and soft palate, cheeks, and base of the tongue. These erosions and areas of necrosis as well as congestion, hemorrhage, and edema can extend into the gastrointestinal and upper respiratory tracts. The abomasum may be particularly affected. “Tiger” or “Zebra” striping is often seen in the large intestines due to congestion in the colonic ridges probably caused by tenesmus. The Peyer’s patches may have necrotic foci and the lymph nodes may be enlarged and edematous. The carcass will most likely be emaciated and dehydrated.

Morbidity and Mortality

The morbidity rate for rinderpest is high. The mortality rate can be high with virulent strains but varies with milder strains.

Diagnosis

Clinical

Rinderpest should be considered in cattle with any acutely febrile, highly contagious disease with oral erosions and/or gastrointestinal signs.

Differential diagnosis

Differentials for rinderpest include bovine virus diarrhea (mucosal disease), infectious bovine rhinotracheitis, malignant catarrhal fever, foot-and-mouth disease, vesicular stomatitis, salmonellosis, necrobacillosis, paratuberculosis, and arsenic poisoning. Bovine virus diarrhea – mucosal disease may be less likely in some cases because it affects primarily animals from 4 to 24 months of age whereas rinderpest can affect cattle of any age. In sheep and goats, peste des petits ruminants is a differential.

Laboratory tests

Virus isolation and identification is necessary to confirm a diagnosis of rinderpest.

Peste des petits ruminants virus (also a Morbillivirus) has common antigens with rinderpest virus. When both diseases are present, the diagnosis must be confirmed using an enzyme-linked immunosorbent assay (ELISA test) following specific antigen capture. The diagnosis can also be confirmed with viral-specific RNA detection methods such as nucleic acid probe hybridization and reverse-transcription polymerase chain reaction (RT-PCR).

Samples to collect

Before collecting or sending any samples from animals with a suspected foreign animal disease, contact the AVIC. These samples should only be sent under secure conditions, by authorized personnel, and to authorized laboratories to prevent the spread of disease.

The best time to collect samples for rinderpest is when a high fever and oral lesions are present but before the onset of diarrhea. This is when viral titers are highest. Ideally, an animal should be necropsied and the following samples collected: blood in EDTA or heparin, blood for serum, swabs of lacrimal fluid, necrotic tissue from oral lesions, lymph nodes (aspiration biopsy may be helpful from a live animal), spleen, and tonsil. Samples should be transported on wet ice, not frozen. If a necropsy is performed, a complete set of all tissues and lesions should also be sent in 10% formalin.

Recommended actions if this rinderpest is suspected

Notification of authorities

State and federal veterinarians should be immediately informed of any suspected cases of Rinderpest. Federal: Area Veterinarians in Charge (AVICS)
http://www.aphis.usda.gov/vs/area_offices.htm
State vets: http://www.aphis.usda.gov/vs/sregs/official.html

Quarantine and Disinfection

The affected area should be quarantined, exposed or infected animals should be slaughtered and the carcasses burned or buried. The rinderpest virus can be killed by most common disinfectants (phenol, cresol, sodium hydroxide 2%/24 hours used at a rate of 1 liter/m^2), but can survive for long periods of time in chilled or frozen tissues.

Public health

Rinderpest has not been reported to affect humans.

For More Information

World Organization for Animal Health (OIE)
http://www.oie.int

OIE Manual of Standards
http://www.oie.int/eng/normes/mmanual/a_summry.htm

OIE International Animal Health Code
http://www.oie.int/eng/normes/mcode/A_summry.htm

USAHA Foreign Animal Diseases book
http://www.vet.uga.edu/vpp/gray_book/FAD/

References

"Rinderpest." In *Manual of Standards for Diagnostic Tests and Vaccines.* Paris: World Organization for Animal Health, 2000, pp. 105-113.

"Rinderpest." In *The Merck Veterinary Manual*, 8th ed. Edited by S.E. Aiello and A. Mays. Whitehouse Station, NJ: Merck and Co., 1998, pp. 542-544.

Mebus, C.A. "Rinderpest." In *Foreign Animal Diseases.* Richmond, VA: United States Animal Health Association, 1998, pp. 362-371.

"Rinderpest." 30 Aug. 2000 *World Organization for Animal Health.* 16 Oct. 2001 <http://www.oie.int/eng/maladies/fiches/a_A040.htm >